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ABSTRACT

This volume constitutes a summary of the proceedings of a conference on the issues faced by humanities scholars in scholarly and instructional use of technology. It captures the conjoint thinking of the participants. Following the plenary session surveying conference objectives, the keynote address by Vartan Gregorian, president of Brown University, explores the explosion and fragmentation of information and the tasks of integrating and resynthesizing this information. The following commissioned papers are summarized: (1) "The Intellectual Implications of Electronic Information" (Oleg Grabar); (2) "The Professional Implications of Electronic Information" (Carolyn C. Lougee); (3) "The Implications of Electronic Information for the Sociology of Knowledge" (Richard A. Lanham); (4) "The Institutional Implications of Electronic Information" (William Y. Arms); and (5) "The Implications of Electronic Information for National Institutions" (Lawrence Dowler). Working groups were established for each of these areas, and the group reports are summarized. Comments by participants are reviewed, and remarks from the final session are summarized. (SLD)

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ED 366 321

Technology, Scholarship, and the Humanities:

THE IMPLICATIONS OF ELECTRONIC INFORMATION

September 30 – October 2, 1992

SUMMARY OF PROCEEDINGS

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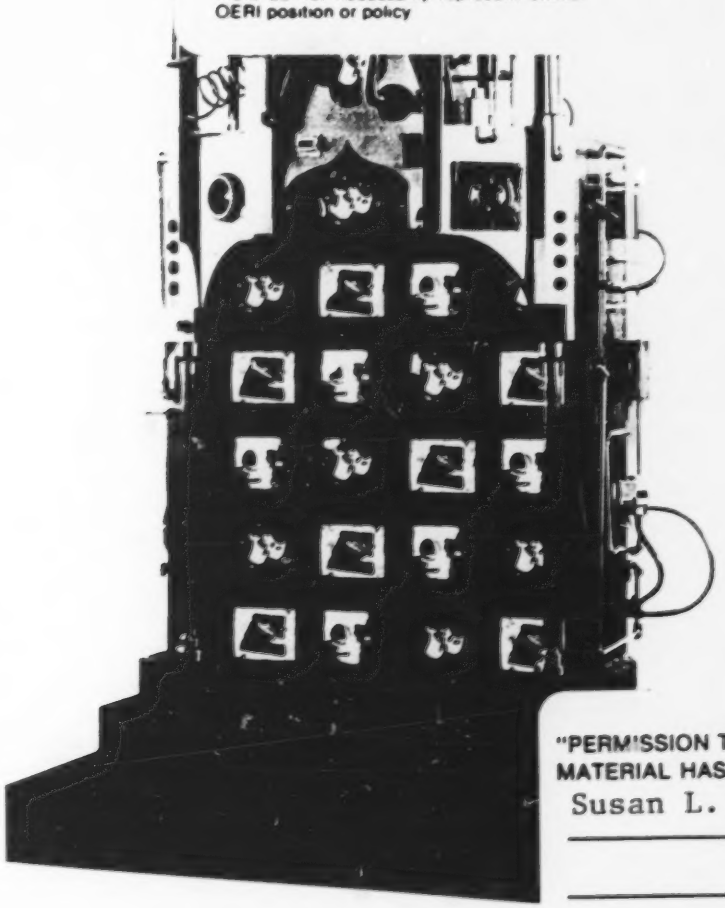

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THE IMPLICATIONS OF ELECTRONIC INFORMATION

September 30 – October 2, 1992

Arnold and Mabel Beckman Center
of the National Academies of
Sciences and Engineering
Irvine, California

SUMMARY OF PROCEEDINGS

This publication was supported by a generous grant from the Andrew W. Mellon Foundation to the American Council of Learned Societies

SPONSORING ORGANIZATIONS

The Getty Art History Information Program

The American Council of Learned Societies

The Coalition for Networked Information

The Council on Library Resources

The Research Libraries Group, Inc.

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Wood structure covered with aluminum sheet. Collaged with metal tubes, copper pipe, gears, electric meters and gauges, circuit boards, machine parts.
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PREFACE

In the early fall of 1992, the Getty Art History Information Program and the American Council of Learned Societies organized a conference on the subject of "Technology, Scholarship, and the Humanities: The Implications of Electronic Information." The conference was also cosponsored by The Research Libraries Group, the Coalition for Networked Information, and the Council on Library Resources. The conference participants were a diverse group including working scholars, librarians, technologists, leaders of national institutions, academic administrators, and the leaders of learned societies. The participants received in advance five working papers designed to assist them in defining the issues in each of five areas of concern. This document summarizes the conversations that those papers inspired and delineates the conclusions that arose therefrom.

From the point of view of the American Council of Learned Societies and the Getty Art History Information Program, the conference was a splendid success. Unlike many such gatherings, it concluded with calls and plans for action on a variety of fronts to assist members of the scholarly community in creating, disseminating, and exploiting electronic tools that suit their intellectual goals. We present this summary as an attempt to encourage wider debate and further innovation in the application of technology to problems that humanists face in their scholarly and instructional programs. The American Council of Learned Societies and the Getty Art History Information Program share a conviction that the issues raised here are among the most important questions facing scholarship and teaching in the humanities in the 21st century. We are grateful to the participants in the conference for their energy and their wisdom, and we are pleased to present the results of their deliberations here.

Stanley N. Katz
President
The American Council of Learned Societies

Michael Ester
Director
The Getty Art History Information Program

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FOREWORD

This volume constitutes a summary record of an important conference. Its brevity is intended to offer a rapid grasp of the main discussion points and conclusions produced by the conference, rather than to convey the spirit and diversity of the event and its participants.

The findings of the working groups are offered as guides to those whose decisions affect the creation and use of electronic resources in institutional, technical, scholarly, and philanthropic settings. Reflecting not just the voice of the scholar nor only that of the librarian or systems specialist, this volume, like the conference, has captured the conjoint thinking of diverse, highly placed experts from the many areas that bear on scholarly computing in the humanities.

Those who want a fuller picture of the thinking that informed the conference are referred to the full text of the keynote address and of the papers commissioned as preparation for the working groups, which are available through the Internet at ftp.cni.org.

ACKNOWLEDGMENTS

Many people contributed their effort and skills to the conference and to this publication. Susan Siegfried, working with Douglas Greenberg and Marilyn Schmitt, oversaw the planning and organization of the conference. Georgia Freedman-Harvey, with the help of Kezia Schulhof, coordinated all arrangements and preparation of materials for the event. The production of this volume results from the collaboration of the Keens Company and Marilyn Schmitt, the review of Douglas Greenberg and Michael Ester, the editing skills of Phyllis Franzek, and the coordination of Georgia Freedman-Harvey. Moderators William Cleveland, Julie Gertler, William Keens, Robin Kramer, and Valsin Marmillion; and recorders Phyllis Franzek, Theresa Menard, Greg Roby, Claudia Bohn Spector, and Mark Sugars were essential to the discussions and reports of the working groups. Philippa Calnan and Ruth Goldway helped to bring the conference to the attention of the broader community. For their valued assistance, thanks go to Margie Grey and the staff of the Beckman Center, Jenny Siegenthaler, Cynthia Scott, Candace Frede, Jan Jarel, Nancy Bryan, Karen Lettner, Cathy Nakano, and John Sawyer. A grant from the Andrew W. Mellon Foundation to the American Council of Learned Societies provided a generous subvention for this publication.

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Plenary Session:
Survey of Conference Objectives

PLENARY SESSION: SURVEY OF CONFERENCE OBJECTIVES BY CONFERENCE SPONSORS (SUMMARIES)

Moderator: *Marilyn Schmitt, Program Manager, The Getty Art History Information Program*

Panelists: *Michael Ester, Director, The Getty Art History Information Program*

Douglas Greenberg, Vice President, American Council of Learned Societies

Paul Evan Peters, Director, Coalition for Networked Information

W. David Penniman, President, Council on Library Resources

John Haeger, Vice President for Programs and Planning, The Research Libraries Group, Inc.

Introductory Remarks by Marilyn Schmitt

This conference was carefully structured to yield concrete results. The planners had commissioned five papers, each addressing a principal topic to be discussed by a working group at the conference. Led by professional moderators, each group is to focus on three key objectives: responding to the prepared paper, formulating short-term and long-term challenges, and defining the various constituencies required to meet these challenges. On the third day, a designated representative from each group will report its conclusions to the plenary session.

Remarks by Michael Ester

Given the large amount of time students spend watching television, given the power of electronic media to engage and transport their users, and given that the Nintendo generation is nearly college age, we cannot suppose that those pillars of the university – the book, the lecture, the library, and the classroom – will remain unchanged by the impact of information technology.

At the same time, because collection management concerns are largely what drive the development of electronic databases, it is not certain that systems will accommodate the contextual and historical information appropriate to scholarship. Moreover, reformulating information about art objects and art history's other varied research materials costs much time and labor and needs long-term maintenance. Arts research databases have appeared in the national landscape largely as cottage industries, and efforts to coordinate

the terms used by various projects have not altered the cacophony of systems that a user must confront. To address these problems effectively, conferences such as this one–in which individuals who actually shape the future developments in their fields can come together–must foster collaboration among scholars, information managers, and technical experts.

The conference's organizers and sponsors particularly hoped that the conference would be a forum through which the humanities would construct a strong, unified message to show funding and professional organizations, government agencies, and university administrations the new structures and collaborative forms that we need. Participants should take advantage of this singular opportunity to give life to our time together beyond this meeting.

Remarks by Douglas Greenberg

Representing 52 humanities and social science organizations, the American Council of Learned Societies (ACLS) has a long history of interest in scholarly communication and in both producing and providing resources to scholars through libraries. In the last several years, technological advances have paralleled significant changes in the methodologies and subject matter of new scholarship in the humanities. This conference presents an opportunity to address both of these issues.

In addition to providing a rare opportunity for a highly diverse group of experts to share their knowledge and experience, this conference will help the ACLS to clarify goals and identify projects for itself and for its member organizations. The ACLS also hopes to find allies who will help the scholarly community become more proactive and organized than it has been in addressing these issues and others, both within our individual institutions and nationally.

Remarks by Paul Evan Peters

The Coalition for Networked Information (CNI), founded in 1990 by the Association of Research Libraries, EDUCOM, and CAUSE, promotes the creation and use of information resources and services in networked environments. Since its founding, the Coalition has worked to frame the opportunities and address the challenges posed by Internet and the National Research in Education Network as digital media providing scholarly and scientific communications and publications. Last fall, the Coalition sought

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access to these networks to deliver public information from the U.S. Government Printing Office and other federal agencies. More recently, CNI began investigating the creation, storage, and retrieval of primary research and teaching materials in networked environments, including the ways that networked information services transform our professions' research and instructional practices. CNI aims not merely to manage information resources, but also to help scholarly communities form and grow in a networked environment. In this new context, the Coalition is an enthusiastic sponsor of this workshop and expects it to be a source of new ideas and initiatives that can soon be pursued by separate elements in research and education working together.

Remarks by W. David Penniman

One of the first decisions of the new president of the Council on Library Resources was to support this conference as a natural outgrowth of the Council's long-term interest in technology's impact on libraries and scholarly research, particularly with respect to the humanities. This conference could provide a vision of the future for the humanities scholar—a future in which libraries use technology strategically to promote the intertwined goals of scholarly research and education for all. This meeting will generate exciting new proposals in program areas deemed most important to the Council, including human resources, library economics, infrastructure, access, and processing. Another desirable outcome of the conference would be a discussion of less technical processes, such as browsing and serendipitous discovery, and how automation may enhance, rather than impede, those little-understood practices.

Remarks by John Haeger

The Research Libraries Group's cosponsorship of this conference stems from its long-established interest in the intersection of scholarship and technology, and in the information needs of scholars and scientists in all disciplines. A survey of these needs in the humanities, which we conducted three years ago, revealed three broad tendencies: First, humanists are concerned with improved access to primary and archival materials, and to early printed materials. Second, there is an increased interest in visual resources, especially photographs and prints, even in fields which have not traditionally been image-dependent. Third, there is growing

interest in a wide variety of machine-readable data files.

"Is scholarship likely to be better if it takes advantage of information technology? Is there a compelling reason to solve this as a problem? Or is a policy of laissez-faire more appropriate? What are the minimal conditions under which computer- and network-assisted access to information resources becomes the 'bread and butter' of the humanistic professoriate?" This conference could constitute a significant step toward answering these important questions.

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Keynote Address

KEYNOTE ADDRESS (EXCERPTS)

Speaker: Vartan Gregorian, President, Brown University

My interest in this conference stems from my concern about our divided knowledge and its implications for education. I am also fascinated by the possibilities presented by technology for integrating knowledge and assisting universities in the task of resynthesizing information.

We are moving rapidly to the dawn of an information revolution that may well parallel the Industrial Revolution in its impact and far-reaching consequences. We are told that the total amount of collected information doubles every four years, yet we are unable to use 90 to 95 percent of the information that is currently available. Nowhere is this more apparent than at the university, where the daunting arrival of information in the form of books and journals has been compounded by an accelerating electronic torrent from thousands of databases around the world.

While it is true that attention to detail is the hallmark of professional excellence, it is equally true that an overload of undigested facts is a sure recipe for mental gridlock. Undigested facts do not amount to knowledge. Our universities, colleges, libraries, learned societies, and contemporary scholars have a fundamental historical and social task and responsibility to ensure that we provide not training, but education. We must provide not just information, but its distillation–namely, knowledge–to protect our society against counterfeit information disguised as knowledge.

This is not an easy task, because in addition to an explosion of information and knowledge, we also face dangerous levels of fragmentation in knowledge. The university, which was to embody the unity of knowledge, now consists of a tangle of specialties and subspecialties and of disciplines and subdisciplines, within which further specialization continues apace. The growth and fragmentation of knowledge and the proliferation of specialties are, in turn, reflected in the curricula of our universities, in which more than 1,000 different undergraduate majors and programs currently are being offered. This has led to the phenomenon that our students often learn to frame only those questions that can be addressed through the specialized methodologies of their particular disciplines and subdisciplines.

Faced with the explosion of information and its fragmentation as well as the proliferation of disciplines and subdisciplines, the faculties of our

universities are confronted with the difficult choice of balancing analysis with synthesis, methodology, and the relevant course content, thus placing more and more responsibility on the student to form his or her own synthesis. But without opportunities for creative discourse among educated persons, both within and outside the university, and without the broad understanding of the premises and assumptions of various academic disciplines, it is not easy for either students or faculty members to pursue complex problems that cut across the artificial barriers between the disciplines.

Today, in our universities, we face the challenge of integrating and resynthesizing the compartmentalized knowledge of disparate fields. Clearly, our age of excessive specialization and fragmentation of knowledge does not call for the abandonment of specialization. After all, the division of labor has greatly advanced the cause of civilization, and verifiability, the habit of testing and correcting a concept through its consequences in experience, is just as firmly rooted in the humanities as it is in the sciences.

As early as 1944, José Ortega y Gasset prescribed a solution to our dilemma in *The Mission of the University*, in which he wrote the following: "The need to create sound syntheses and systematizations of knowledge... will call out a kind of scientific genius which hitherto has existed only as an aberration—the genius for integration." Paradoxically, the same information technologies that have been the driving force behind the fragmentation of knowledge also present us with the opportunity and the tools for meeting the challenge of that fragmentation. If, on the one hand, the new information technologies seem fragmenting, they are also profoundly integrative. Remember, these technologies are fundamentally communication technologies, and their deployment at the university is, as often as not, an exploration of new connections among the traditional disciplines. The process of assimilating new information technologies can, in the right setting, help us think hard and deeply about the nature of knowledge, and even about our mission as a university.

One of the key tasks of the university president is to create a community that is totally informed regarding the values and peculiar identity of its specific institution. If that can be achieved and if all members of the university can trust each other to be motivated by the same shared values, then the community can move forward to address the problems of technology and the integration of knowledge.

Very few institutions will be on the so-called "leading edge" of the technology revolution, but none can escape the risk-taking and wrenching changes that will be necessary to accommodate its own mission and peculiar identity. Every institution will be the site of its own convulsion, and each will contribute something unique to our collective effort to advance learning, education, and culture. At Brown, our guiding principle has been that information, resources, and strategies must be integrated into Brown's basic identity as a single community of scholars—a university college committed to traditional ideals of liberal learning and intellectual community.

As a university president and former librarian, I believe that we are in a revolution, but we do not yet understand its impact. After reading the five papers commissioned for this conference, I suggest that they are all cautious in their assessment of the impact of such developments as artificial intelligence, voice recognition, and other innovations. While we need a dialogue among academics, administrators, and librarians, we also need to hear from those visionaries who are trying to move beyond where we now are. I congratulate all of you, particularly the Getty Art History Information Program and the ACLS, for assembling this conference.

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Discussion Papers
Commissioned for the Conference

DISCUSSION PAPERS COMMISSIONED FOR THE CONFERENCE (SUMMARIES)

The Intellectual Implications of Electronic Information

Author: Oleg Grabar, Professor, School of Historical Studies, Institute for Advanced Study, Princeton

The changes, novelties, and possibilities presented by electronic information will affect much more than scholarly output; they may actually modify the very nature of knowledge. This paper offers observations under the following four categories:

1. *Scholarship in the Humanities.* There is a difference between learning and scholarship in the humanities, in that a scholar has the ability to modify the character or quality of what is known, to affect its understanding. Given that fact, the role of electronic information is, as of now, quite limited. While innovations like the word processor or electronic card catalog can make writing and research easier and faster, they cannot make the resulting product better or more insightful.

2. *Sources as Resources.* It is easy to argue that the availability of information in accessible form is a good thing and that computers are excellent instruments for gathering facts and categorizing them. Significantly, there may be a cost advantage in the total computerization of factual information, and this is an important argument in its favor. However, some problems remain. Some are technical, including the difficulty of fully assimilating man-made images into the computer environment. Others are ethical and involve the question of who, or what body, is to decide what to include in and what to exclude from the newly created databases. Will professional scholars take part in these decisions, and will there be an official distinction between necessary and optional information?

3. *New Horizons.* Computer-based activities in the humanities have been positive in some unexpected ways. Computer-aided design (CAD) systems, for example, can provide visual images based on information from archaeological and written documents. These reconstructions can help clarify, and even change, the existing scholarly consensus on historic structures. In this case, a computer's flexibility allows a wider range of possible views than conventional media, providing unexpected and illuminating results. Used this way, computers force scholars to clarify their mediating assumptions, those often hidden attitudes and beliefs that transform facts and interpretation into information. The computer, by asking simultaneously about the processes of

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seeing and creating and about the product or scope of the data provided, may bring to light hitherto hidden, but essential, scholarly mechanisms, compelling a field to shed its reluctance to think and talk about its own embedded practices.

4. *Scholarly Existence in a New Electronic Era.* Costly technology will make scholars more dependent on institutional support, more in need of technical services, and more pressed for time as they struggle to acquire new skills. A certain kind of literate culture is bound to disappear, and with it something of the imaginative creativity that fed the humanities for the last century. Even more importantly, a new intellectual ethic will emerge. Scholarship in the humanities will be able to maintain its universal potential, its assumption of ubiquitous validity, and its availability for all fields only if the data it is based on either are universal (the preferred solution) or have clearly proclaimed limits. Put another way, the transformation of the humanities is worth accomplishing only if it is done on a grand scale, and fairly rapidly, and if it enlists the participation of needy countries and institutions as well as wealthy ones in the forefront of research.

In conclusion, the educational possibilities of electronic media appear greater than the intellectual possibilities. No new scholarship has yet emerged to replace traditional approaches, although computerization has made mediatory assumptions more visible. Meanwhile, the key problem posed by electronic media remains as follows: Who decides what information to include, what languages to use, and what audiences to target?

The Professional Implications of Electronic Information

Author: Carolyn C. Lougee, Senior Associate Dean, School of Humanities and Sciences, and Professor, Department of History, Stanford University

Of the many issues raised by the proliferation of electronic information and its impact on the academic profession, some of the most obvious concern the issue of professional advancement. There is the question of scholarly research: whether the profession will consider electronic publishing analogous to print publishing or view creating databases as equivalent to producing a critical edition of a text. However, these problems, which are chiefly matters of form, may be relatively transparent and easy to solve in comparison to the more complex and far-reaching questions related to teaching as a

factor in professional advancement. For example, can we adapt current ways of evaluating teaching to acknowledge and reward efforts in electronic instruction? If not, can we change current reward structures to accommodate new developments?

Current practices in American colleges and universities present formidable obstacles to faculty involvement with electronic instructional resources. Such time-consuming activities as developing new software lack prestige and are devalued in advancement decisions, which leaves little incentive for the individual teacher beyond the intrinsic reward of helping students. To reward faculty innovations in electronic instruction, American institutions must address three specific problems. First, faculties must establish a peer-review process to evaluate computer software for quality and effectiveness. Second, review and tenure committees should consider software development an extension of teaching and should reward it as such. Third, if electronic instruction is to be an effective yardstick, institutions must address the current imbalance between the importance of teaching and the importance of research in tenure decisions. They must convince the American professoriate that "teaching is the lifeblood of colleges and universities, the sine qua non for their primary support and for their patronage by students."

Beyond the issue of professional advancement, the proliferation and application of electronic information resources may affect other aspects of academic practice. Unless academic professionals, especially in the humanities, resist the trend, electronic information resources will accentuate professional ties over institutional ones, depersonalize the community of teachers and learners, exacerbate inequalities, and infringe on the professoriate's monopoly on higher education. These centrifugal effects of electronic resources may bolster scholarly autonomy, but the integrity of the professoriate and our ability to fulfill both professional missions (of teaching and research) depend on collegial solidarity within the institution. Technology, in addition to turning faculty attention outward, may decentralize instruction, sweeping aside the traditional rationale for the university as "a place of concourse."

The prospect of remote broadcasts of courses, reduced faculty, unused campus buildings, and abandoned student services raises crucial questions about the future shape of the academic profession. Telecommunications

could encourage the sharing of courses–"super courses" with state-of-the-art features beyond the reach of individual professors. But who would be anointed to teach these courses, and would they be able to copyright and receive income from them, as some scholars do with videotapes? If they were sponsored by universities, would the institution have an interest in regulating their content? If such courses were widely used, would degrees cease to be university-specific? Electronic instructional resources could relieve faculty from time-consuming lecture courses, allowing them to reinvest time in tutorials and more personalized instruction, or the number of faculty in American institutions could simply decrease. Differential access to computer hardware, software, and services could also exacerbate inequalities among students, institutions, and disciplines.

Although the humanities were at risk even before electronic information resources began their transformation of the university, the "information age" could put universities under increasing pressure to turn out scientists and engineers, relegating the humanities to the status of frill. Additionally, academics must recognize the potential of the new technology to undermine the professoriate's monopoly on advanced education. While the road to a professional career, whether in the sciences or the humanities, presently runs through the university, the electronic university of the future may lose out to competition from the "corporate college" recently proposed by the CEO of IBM.

It is certain that the decade in which we face the challenge of integrating electronic information resources into our professional lives will be a time of unprecedented budget constraints as well as a time of public questioning about the very structure of the university. Responsibility for bringing the university into the information age will be the most important professional implication of all.

The Implications of Electronic Information for the Sociology of Knowledge

Author: Richard A. Lanham, Professor, Department of English, University of California at Los Angeles

This paper will address the following questions: How will electronic information affect the organization of humanistic knowledge and the social basis of its production and dissemination? How will electronic information affect undergraduate teaching? Will graduate training change

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as students become more adept at using electronic tools?

The technology of print and the humanistic ideology of the authoritative text converged to establish the codex book as the basic operating system for humanistic knowledge since the Renaissance. The immutability of printed books reinforces the idea of the single author, and their physicality lends itself to their legal status as intellectual property. However, some have predicted that the culture of the book is coming to an end, as texts are no longer fixed in print, but projected on a screen, available for emendation, revision, and reformatting by the reader, transforming both author and authority.

Electronic information affects the organization of humanistic knowledge and the social basis of its production in some fundamental ways. The spontaneity of online interchange alters the time scale of humanistic debate; the protective carapace of copyright law dissolves before texts without physical embodiment; traditional notions of narrative order no longer apply; and linearity gives way to hypertextuality. But beyond the effects of digital transformation itself, a new medium—multimedia—is becoming a basic mode of cultural expression. This composite of techniques can manipulate text both visually and conceptually, allowing the reader to construct both the appearance and the level of generality of the text. Color, pictures (both still and moving), and sound (including spoken words) create a Wagnerian Gesamtkunstwerk for the common reader, altering, at the deepest level, humanistic expression and the means of disseminating it. Art, literature, and music are actually democratized in ways that were only foreshadowed in the aesthetics of early twentieth-century modernism.

In light of these massive changes in the organization and production of the humanities, "humanism" can no longer be defined as the narrow study of the arts and letters in their "high" or formal aspects, but must be expanded to include some fundamental areas of inquiry that are currently omitted. In particular, behavioral biology, behavioral neuroscience, and the study of nonlinear systems are all disciplines that are being driven into collision with the humanities by the logic of digital technology. This constitutes the most profound way in which technology is affecting "the organization of humanistic knowledge."

How will these developments affect undergraduate teaching? As traditionally taught, each class exists in a temporal, conceptual, and social vacuum, as students are unaware of previous classes, do not read one another's papers, and rarely adjust their work in response to the instructor's suggestions. But if an electronic library were employed in a Shakespeare class, for example, students could read papers submitted in earlier classes, read scholarly articles on the same topics, read before-and-after examples of revised work, do searches of Shakespearean texts for imagery or rhetorical figuration, and make excerpts of videotaped performances to illustrate their papers—all without going to the campus library. Most importantly, a course like this would have a history and could be accessed by people in other courses; it would constitute a continuing society, its students becoming citizens of a commonwealth. The fixation on the instructor as the primary reader would be broken as authority passed to the group. Electronic resources radically change the nature of the classroom, the textbook, the literary texts, the major, and the curriculum.

The final question, whether graduate training will change as students become more technologically adept, is the wrong question. More properly, the question is whether the subjects they study will continue to exist. While I do not think literature will die, it will certainly change as it moves from page to screen, and graduate programs should address this.

The "sociology of knowledge" in the humanities is now dominated by three convergent forces: technology, theory, and democracy. Although higher education has been democratized since World War II, it is possible that technology has been an exclusionary force, with inner-city schools commanding far fewer computers than Andover or Exeter. In the long run, however, digital technology continues the democratization process by opening discourse out from a strictly verbal base, opening artistic composition and performance, and greatly expanding access and audience for artistic and learned expression. As the current budget crisis presses down on universities, why not use the occasion for long-term planning and a re-examination of the idea of the "department," the "course," and the "major," in light of a fundamentally changed humanistic operating system?

The Institutional Implications of Electronic Information

Author: William Y. Arms, Vice President for Computing Services, Carnegie Mellon University

Electronic information and computer tools have irrevocably changed the nature of scholarship, and universities must provide the leadership necessary to manage this change. At Dartmouth and Carnegie Mellon, the success of campuswide computing initiatives was directly attributable to the strategic vision of their respective presidents, John G. Kemeny and Richard Cyert, both of whom overcame resistance from reluctant faculties.

Unfortunately for many universities, the arcane and inflexible processes by which they allocate resources can hamper the development of new, nontraditional projects using electronic information technologies. New initiatives require new funding, and in tight economic times this means making hard choices. But such choices are being made, and each year the portion of university budgets devoted to computerization and support staff increases. Granted, existing electronic libraries are far more modest than the bold projections of the 1980s would have led many to expect. They are typically small, expensive, and difficult to use. However, they constitute the first step in a revolutionary process and are constantly expanding and rapidly improving. This growth in electronic resources has become increasingly important to the humanities. It has stimulated a growth in experimental interdisciplinary scholarship. Projects such as the computerized *Oxford English Dictionary* have engaged the cooperation of lexicographers, computational linguists, corporate funders, and a range of administrative support personnel. As computerization permits humanists to work on larger, integrated projects, along the model of the experimental sciences, we need to bridge the cultural division between scholars, librarians, programmers, and technicians.

As humanities scholars adopt hypermedia and digital technology, humanities faculties will have to adjust to the traditional tenure evaluation processes. They need to rethink the current criteria based on books, monographs, and articles and to redefine scholarship to include new forms of research and instruction. It seems unreasonable that innovative electronic teaching and information programs must be re-expressed in printed form before review and tenure committees can evaluate them as scholarship. It seems only reasonable to grant electronic publishing the prestige currently afforded print publishing.

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The potential of electronic information to foster large, experimental research projects in the humanities points up some significant differences between the funding of humanistic and scientific scholarship. The scientific community has long funded its capital-intensive projects with support from government and industry. In contrast, only 2 percent of humanities research funding comes from the U.S. government. As a result, the humanities can undertake few large, interdisciplinary projects unless the government and other funding agencies perceive the outcome to benefit the entire academic community, as was the case with the Commission on Preservation and Access. More money is needed, and our universities are not rich enough to raise it on their own.

The university library is declining in importance relative to other information sources. Any college, department, or individual can mount its own information on computers, thus becoming part of a national electronic library service—in effect, an open library. Given the importance of electronic information to the future of libraries, institutions should implement changes in resource allocation, including the withdrawal of conventional services, such as card catalogs, when the new services have proved their worth. No institution can afford to maintain duplicate services. To fund this transition, universities must allocate new money.

The Implications of Electronic Information for National Institutions

Author: Lawrence Dowler, Associate Librarian for Public Services, Widener Library, Harvard University

The future of research will depend on our ability to create a new concept and definition of research resources and a new institutional framework for addressing those issues that will affect the quality and diversity of research. The convergence of three trends is undermining traditional notions about research libraries and has prompted the search for new models to support research resources. First, new economic conditions are affecting higher education and research libraries, as operating costs rise and state and federal support for higher education declines. Adding to libraries' economic woes are the rising costs of a rapidly growing body of research materials, the growing expense of new shelf space, and the pressure to adopt new, expensive information technologies.

Second, changing patterns of research and inquiry are increasingly incongruent with existing library programs and services. The rise of interdisciplinary and cross-cultural research has increased the demand for nonprint materials, including photographs, films, ephemera, and personal papers. Additionally, the cataloging and classification of books tend to reflect traditional academic disciplines that fail to provide the kind of topical access needed for interdisciplinary research. For some librarians, automation and networked information may provide a solution to these problems, while for others they portend the end of the library as we know it.

Third, the dramatic development of information technology is affecting the methods of research and challenging the capacity of existing institutions and organizations to operate effectively. Cooperative relationships will replace the competitive relationships among relatively autonomous institutions, and local autonomy will diminish as information networks emerge nationally. Information technology can change our perceptions of information and our analysis of problems, but may also signal the end of the distinctive worldview long embedded in the humanities. Thus far, information technology has had only a limited impact on humanities scholarship because it has generally focused on the needs of scientists and engineers. If this technology is truly to benefit the humanities, their scholars must play a larger role in its design and development. Finally, universities must pay some attention to recruiting and training librarians during this transition. The current emphasis of libraries on administrative and management skills needs to be supplemented with greater discipline-based knowledge and an understanding of information technology.

Future support for academic research, especially in the humanities, will depend on the participation and leadership of universities in creating a new definition and concept of research resources. We need to develop a national, cooperative system of research resources that is both varied and predictable. This will require the development of strategies for evaluating information and determining what to preserve and record. Only if the entire research community considers this enterprise a national priority will individual institutions realize the large-scale savings in necessary preservation and acquisition costs.

This national research system will require a new institutional framework, a national umbrella organization, to bring together the appropriate scholars,

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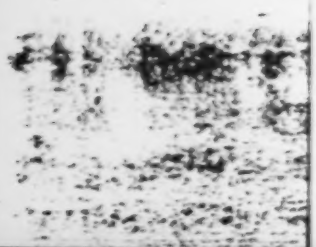
technicians, administrators, and librarians who can realize this project. This entity, which might be called the National Research Council for the Humanities and Social Sciences, would address the critical questions of how information will be rationed–that is, who will pay for it, and who has access to it. Such a development will be particularly important to preserve diversity in research, especially research in the humanities. The humanities are increasingly vulnerable in the current economic climate, because they are relatively unconnected to issues of productivity and profit and have not been fully engaged in developing information technology for research purposes.



Themes Common to the Five Working Groups

THEMES COMMON TO THE FIVE WORKING GROUPS

1. Initiate a national collaborative effort to pursue an active advocacy role for the humanities in today's rapidly expanding electronic environment. Working with existing advocacy organizations, enter the current dialogue, both inside and outside the academy, on the development and direction of new information technologies to serve the humanities.

2. Promote, as a national priority, the creation of a 10-million-volume digital library, broadly conceived to encompass the full spectrum of humanities research collections.

3. Ensure that humanities scholars participate in decisions affecting the creation and selection of electronic research resources and in the development of policies to facilitate access to those resources.

4. Identify and develop exemplary collaborative programs, projects, and individuals that demonstrate the effective creation, sharing, and distribution of electronic information among institutions, organizations, and individuals in the humanities.

5. On the individual, disciplinary, and institutional levels, collaborate within and outside the humanities in the development of standards for the exchange of, access to, and description and preservation of electronic research.

6. Investigate how the humanities can use information technology to increase, reallocate, examine, and generate resources in new ways.

7. Adjust the current definition of scholarly research and instruction to reward innovative uses of electronic information and media.

8. Enlist humanities scholars to interpret the impact of information technology on society, and promote critical understanding of the role that information technology can play in both research and teaching.

9. Sponsor initiatives—workshops, fellowships, and summer institutes—that provide opportunities for training and that enrich the mixture of information technology and the humanities.

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Working Group Reports

WORKING GROUP REPORTS (SUMMARIES)

Group I: The Intellectual Implications of Electronic Information

Rapporteur: Werner Gundersheimer, Director, Folger Shakespeare Library, Washington, D.C.

In an effort to grapple with the profound and overarching topic it had been assigned, Group I focused on a number of specific issues that they considered integral to it:

- In the course of this long-term process, the humanities will need to speak in a coherent voice. They should form an ongoing, interdisciplinary group to identify the most compelling problems and possibilities that the humanities/technology nexus offers and to formulate an emerging agenda for research and future efforts. This group would also create and supervise demonstration projects as possible prototypes.

- As part of that structure, or as a parallel organization, the humanities should catalog and assess the effectiveness of current and future software resources for humanities scholars and research projects.

- Because technology changes so rapidly, one institution should host periodic meetings at which creative users of information technology could envision future technological developments.

- Funding for technologically based research and its relation to current government funding for the arts and humanities need examination. The humanities should enlist an appropriate agency to advocate support for technologically based research, either through the National Endowments or through other governmental sources.

- There are too many idiosyncratic local and ad hoc initiatives for electronic information in the humanities in the United States, exacerbating the inaccessibility of databases. International cooperation on technical initiatives will be as crucial for the humanities as for any other field. The growing globalization of technology should dovetail with a cosmopolitan openness to non-Western cultural materials in electronic form.

- The question of who shall control the process and development of technological research generated considerable anxiety in the group. Although humanists want to participate in this process as fully as scientists and engineers, it will require a change of roles and a much stronger investment in the outcomes of technologically based research.

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Group II: The Professional Implications of Electronic Information

Rapporteur: Roger Bagnall, Dean of the Graduate School of Arts and Sciences and Professor of History and Classics, Columbia University, New York

The deliberations of Group II were profoundly shaped by Carolyn Lougee's paper. As Lougee argued, electronic contributions to instructional materials continue to suffer from the lack of recognition afforded excellence in traditional teaching. Moreover, electronic processes will exacerbate the tendency to value professional autonomy over connections to the university community and even threaten the university as a physical congregation of teachers and students.

If teaching is to gain a central place in our institutions and if technology in the service of instruction is to flourish, we must change the value system of higher education. Group II's recommendations were made in light of the following observations: that technology can as easily intensify existing problems as solve them, that the humanities must address the issue of technology soon to avoid further marginalization, and that we should recommend measures that can be realized within existing institutions' structures.

The recommendations of Group II were as follows:

- The university must provide humanists with an environment favorable to the use of technology by giving them access to electronic mail accounts, online resources, Internet, and electronic journals. The larger goal of a national electronic library, with millions of volumes online, should be a national priority.

- Just as much as their academic counterparts, nonacademic scholars need access to the academic network and information about successful uses of technology via newsletters, annual meetings, and electronic bulletin boards and journals.

- Academic officers should offer incentives to younger tenured faculty to take account of electronic research when they become members of tenure committees.

- Institutions should use foundation and National Endowment support to offer students and faculty summer workshops and graduate fellowships in technology and teaching. Collaborative ventures among undergraduate

programmers, graduate researchers, and faculty advisers could produce valuable educational programs and bring students into the enterprise.

- Conference organizers should disseminate the results of this conference widely, and continue its agenda beyond this meeting. They should advocate the humanities' causes in national deliberations on the future of technology.

Group III: The Implications of Electronic Information for the Sociology of Knowledge

Rapporteur: Gillian Lindt, Professor of Religion, Columbia University

Group III dealt with broad, abstract cultural and historical issues. It recommends establishing a continuing forum to analyze and interpret the implications of new technology for the humanities, including the changing categories of human knowledge and the shifting bases of its production and dissemination. This interdisciplinary forum could take the form of conferences, seminars, and computer networks involving representatives from the arts, architecture, history, literature, publishing, libraries, museums, technology, psychology, neural sciences, and other relevant fields. Among other problems, the forum would develop a common language for analyzing technology issues, re-evaluate traditional models of education and training, develop an agenda for using technology to increase public access to materials in the humanities, and analyze the changing character of educational institutions and their methods. The forum would develop proposals for humanistic projects using new technologies and synthesize the broad cultural and social ramifications of new technologies.

Group III also recommended the following:

- The humanities need to alter existing educational practices by integrating computers into instruction as tools for critical thinking, by exploring hypertext and multimedia, and by training faculty to use electronic information technology.

- The humanities need to play a key role in shaping new technologies and in extending the humanities beyond universities to the rest of the world. Democratizing access will be essential to the viability of the humanities and to the character of this society as a democratic nation. Libraries and

museums will be leading partners in disseminating and using interactive educational technologies.

Group IV: The Institutional Implications of Electronic Information

Rapporteur: M. Stuart Lynn, Vice President, Information Technologies, Cornell University

Group IV agreed that the institutions nurturing the humanities, such as universities and research and professional institutes, must actively influence the development of digital information technologies to maintain the vitality of the humanities. However, not institutions but scholars and their particular needs and values must drive this initiative.

As the gradual acceptance of word processing and online catalogs indicates, strategies for change can be evolutionary rather than revolutionary. Introducing technology, however, requires resources, and the humanities must attract new communities of support, including those in the private sector, especially as federal and state funding decreases.

The group addressed the institution's relationship to the scholarly community, to itself, to other institutions, and to society. It proposed five recommendations to institutions:

- Work with the scholarly community to set standards and define norms of access to information, removing barriers that inhibit humanists' use of electronic information. Institutional support of education and training programs is essential if humanists are to take full advantage of electronic resources and initiate model projects.
- Individually and in collaboration, consider the use of technologies in the humanities as central to their own institutional mission; that is, make low-cost, universal access for all scholars a strategic priority, and foster scholarly innovation in electronic learning.
- Form collaborations and coalitions as a means of sharing resources, developing new sources of financial support, and using electronic information technology to preserve the existing record of our heritage.
- Join forces to advance the cause of the humanities in society as a whole to ensure democratic widespread access to digital networks and libraries.

Only by developing a broad public consensus can the humanities garner national support.

- Examine opportunities to finance infrastructural change via the sale of information to those who will use it for commercial gain.

Group V: The Implications of Electronic Information for National Institutions

Rapporteur: James Noblitt, Humanities Chair, Institute for Academic Technology, Research Triangle Park, North Carolina

Group V identified certain challenges and opportunities as the humanities engage electronic information technology. First, the humanities must reject the "zero-sum" approach to resource allocation currently practiced by public funders, who increase support for information technology at the expense of humanities research. Second, as the use of information technology in research and education changes our institutions, we can rethink the way museums, libraries, and educational institutions work together. Third, the democratization of knowledge will surely have an impact on the fundamental assumptions of humanistic scholarship.

To address these challenges and opportunities, the humanities should inaugurate an open-ended forum, possibly under the aegis of the Coalition for Networked Information, with the following goals: to commission a position paper to study the implications of electronic information for the humanities and to identify exemplary projects and "heroic" accounts of individuals using new technology in their scholarship.

Long-term goals that may lie outside the purview of the forum include the following:

- The need to address the uses of information technology in integrating data from different sources, taking into account questions of intellectual property rights.
- The possibility that the ACLS or the National Endowment for the Humanities could sponsor institutes devoted to educating students, faculty, and other humanists in both the new media and new scholarly practices.
- The establishment of a conceptual framework for the humanities that uses the new media in a self-conscious and critical way.

Comments by Participants

COMMENTS BY PARTICIPANTS

Susan Hockey: Group I members could have used a broader base of knowledge regarding what is possible in technological research in the humanities, especially since current uses of technology in the humanities are often 20 years out of date. Although some of us have long been disseminating this information, it does not seem to reach the right people. If we do not address this, we are in danger of reinventing the wheel by duplicating the work of other groups.

Richard Lanham: Later conferences might provide some examples of existing technology to bridge the knowledge and understanding gap among the many participants.

Whitney Davis: There is an implication that humanists have not lived up to an obligation to revolutionize their practice through technology. In reality, many of us already feel that our practice is revolutionary, imaginative, and responsive to the needs of our culture and society. Group II felt that this gap was perceptual and that simple strategies, such as having undergraduate programmers work with faculty members, could have major consequences.

Group III's call for an analysis of the meanings and cultural implications of technological research suggested one area in which humanists would not sit at the feet of technologists but would lead. In art history, communications, English, and cultural studies departments, people have thought a great deal about the cultural meaning of the new media, and the departments are well prepared to interpret them to society as a whole.

Douglas Greenberg: Did Group I discuss what we would gain and lose during the shift to technologically based scholarship?

Werner Gundersheimer: Not to the extent that Dr. Grabar's paper raised it. We could certainly promote a cooperative approach to knowledge, which may disturb a field that has traditionally celebrated scholarly autonomy and individual authorship.

Kinshasha H. Conwill: Group III agreed that the humanities need greater advocacy for the central role they play in our society. To accomplish this we need breadth of collaboration. Humanists must reach beyond the university to the people and institutions that translate scholarship to the larger public, including artists, museum professionals, librarians, and others.

Jann Matlock: Group I raised this in regard to how the humanities' funding priorities may change in light of technological advances. Funding new databases may reduce funding for traditional research. Our group thinks that we should lobby on behalf of increased resources for the humanities as a whole, and not simply for greater technological investment.

Stanley Katz: The humanities have been traditionally excluded from public support. Even with the establishment of the National Endowments, public research funding is less than 2 percent of the total funding. Until the public understands that it is in its interest to invest much more heavily in the arts and humanities, we will not find the needed level of support for humanities research among private funders.

Mary Case: I believe that there will be plenty of funding for projects such as creating a national electronic library, which is analogous in scope and vision to Kennedy's call in the 1960s to put a man on the moon. But this is only possible if the humanities will act as a unified force.

David Bearman: We seem unable to identify a primary "driver" of fundamental change. If we are, in fact, in an information economy, then humanists add value to the natural resources driving that economy. Because we were traditionally the only market for our own products, it has long been held that these resources should be freely available. However, in an era when public funding is being withdrawn, our attitudes toward this intellectual property may have to change so that we "lease" rather than give away what we own. If we do not take this role as "value-adders" seriously, even if this sharply challenges long-held notions of "fair use," we will impoverish both our constituents and ourselves for the rest of the century. We will either become part of the economic system that is driving development or be taken advantage of by it.

M. Stuart Lynn: Group IV agreed that open, if not free, access should be a cornerstone of the humanities' approach to electronic information. We should fund those who need it, and charge for their use of intellectual property those who reap direct commercial advantage from humanities research.

Conwill: Coming from the arts community, which has been battered as badly as the humanities community in recent funding cuts, I have a few cautionary notes. One is that there is a perception that the arts and

European and Latin American countries into monitoring preservation films internationally. That work offers a good model for involving these countries in the development of an electronic virtual library.

Conwill: We can do much work in communities within this country—African-American, Latino, Asian, and Native American. Historically, black colleges and universities offer a great opportunity to build resources and access.

Oleg Grabar: These issues need to be seen from the point of view of the practicing scholar, who is overloaded with information coming through normal channels and kept from the real business of scholarship. We must not put the cart before the horse, and we must remember that true scholarship is the transformation of facts into ideas.

Valdes: This might be an appropriate stance for you to take, yet that is a narrow view of scholarship, especially since many other scholars, particularly those outside the United States, are continually hampered by a lack of information that electronic technology could alleviate.

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humanities do not serve the broader public. Another is that arts institutions' entrepreneurial approach has not diminished the need for public funds, partly because such income is highly taxed. We must foster the idea that activities that develop and flourish outside the market—as do the arts and humanities—serve the public good. We must address both of these problems by reaching out to the public and the government and convincing them of our importance to the quality of life.

Susan Brynteson: Group III raised the important question of democratization and information resources. Although humanists take freedom of expression for granted, we should prepare to come under serious attack over what kinds of information we decide to include in and exclude from information resources, especially when such information involves controversial topics, such as abortion, homosexuality, Holocaust revisionism, propaganda by White Citizens' Councils, and so forth.

Mario Valdes: As a member of Group III, I want to emphasize how fundamental accessibility of electronic resources to those not in the academy is to the sociology of disseminating knowledge. If we do not address this, we will exacerbate the existing gap between insiders and outsiders. Technology may also either widen or narrow the resource gap between libraries in the United States and those in less affluent parts of the world.

Thomas Reese: We invoke democratization, but is it a pipe dream? Since we cannot afford to do everything, the values of technology and humanities cultures are at odds. Do we want to support faculty research leaves, teaching initiatives, and social experiments, or the technological revolution in our resources? Do we fund collection development and acquisitions of new forms of knowledge or cover the cost of getting online what we already know and have?

Czeslaw Jan Grycz: My recent work in Eastern Europe suggests that emerging democracies and developing countries want to see the United States as empowering others through information. We can serve an important international function by linking people who are pursuing similar goals, yet have different perspectives. The global implications of the virtual library and international electronic information resources make this a peaceful, stabilizing activity.

Roger Bagnall: The Commission of Preservation and Access brought

Final Session:
Remarks by Conference Sponsors

FINAL SESSION: REMARKS BY CONFERENCE SPONSORS (SUMMARIES)

Moderator: *Douglas Greenberg, Vice President, American Council of Learned Societies*

Panelists: *Paul Evan Peters, Director, Coalition for Networked Information*

John Haeger, Vice President for Programs and Planning, The Research Libraries Group, Inc.

Michael Ester, Director, The Getty Art History Information Program

W. David Penniman, President, Council on Library Resources

Stanley Katz, President, American Council of Learned Societies

Remarks by Douglas Greenberg

The final session would be devoted to what the sponsors' representatives believed were the key conclusions of the conference and to the actions they would take in the months ahead. One primary goal of the organizers was to assemble representatives of core constituencies in the humanities and in technology who would not ordinarily have the chance to meet. Many model projects are already in the planning stages because of this gathering.

The speed and magnitude of technological change are growing because of systemic changes in our society. Whether this change is evolutionary or revolutionary is difficult to judge, but it is what historian David Hackett Fischer has called "deep change," a change in the rate of change. One thing missing at the conference was a sense of the scope and pace of what is already happening in electronic technology that could have a significant effect on the humanities. To address this lack of broad knowledge of scholarship that uses technological tools, the humanities must find more and better ways of disseminating information about what technology has helped them to achieve.

Another missing element was a discussion of the relationship between new methods of research and the recent changes in humanistic subject matter. While the papers alluded to these phenomena, the working groups did not analyze them substantively or propose further study. The groups

also circumvented the questions of how technology will affect traditional reading, writing, and research and whether technology will foster collaboration or reinforce individualism in scholarly work.

Several themes emerged, however, as common concerns of all five working groups: the need for a coherent voice in the humanities to address technological issues and the call for an ongoing forum. While we may not be able to do the former, we can surely achieve the latter. Additionally, all five groups agreed that we need to act at the national level to continue the dialogue on electronic research in the humanities. Unsurprisingly, the complex, urgent financial issues facing humanities research were a key focus of all the working groups, as was the triad of related issues—access, democracy, and internationalization. These difficult issues clearly need more intensive discussion, and the reiterated theme of "empowerment" should prompt the critical question "Empowerment for whom and for what purpose?"

The working groups often mentioned the need for model projects, particularly those that connect technological development issues to humanities issues, for example, the question of the integration of knowledge and the relationship between teaching and research.

We did not discuss how technology may well foster not the collaboration we hope for, but even more individualistic research than we have had in the past, unless we control this development. "We need a baseline of knowledge about what we have now," an inventory of available information and programs to expand and raise the level of discussion on the impact of technology on scholarship. Humanists must also continue striving to adapt technology to fit their values as scholars and teachers, rather than permitting technology to reshape their values.

The humanities will not solve their problems unless they expand the dialogue through training and education to include people outside the humanities and their institutions. Participants should return to their home institutions with a long-range strategic vision that leaves them better prepared to act, more willing to enlist allies, and clearer about what they can do as individuals both to foster collaboration and to tackle the problems where they work and study.

Remarks by Paul Evan Peters

The Coalition for Networked Information believes that the network must be as diverse as possible, which means that control of the network must be widely distributed and flexible to avoid parochialism. As such, the network constitutes a "new ecology of thought and action," which generates a human community and allows new options and partnerships.

Four key recommendations generated during the conference fall within the scope and capacity of the Coalition. First, the Coalition could closely tie the projected digital library of 10 million volumes to existing preservation efforts that are not focused on microfilm. It should coordinate such a project with the development of new publication processes. Second, the Coalition will participate in advocacy efforts on behalf of electronic research and will work against the "zero-sum" approach now practiced by government funders. Third, the Coalition is interested in supporting summer programs and institutes for those who want to advance their understanding of electronic research in the humanities. Fourth, the Coalition will seriously discuss the recommendation that it structure the proposed ongoing forum on electronic information and the humanities, which should be highly collaborative. I will initiate preliminary meetings on this recommendation.

Remarks by John Haeger

The good news from this conference is that none of the relevant activities currently being supported or encouraged by the sponsoring organizations appears "seriously wrongheaded." The bad news is that the main questions RLG brought into the conference remain unanswered. There is no consensus whether computer-assisted techniques and computerized resources will actually improve the quality of humanistic scholarship, or affect its economics in a positive way. Until this question can be answered positively, unequivocally, and enthusiastically, programs which aim to advocate increased investment in such technology will be compromised. It is also not clear how much proactive problem-solving and program planning humanists really want or need. Even the working groups which advocated proactive approaches to scholarship and technology relied on reactive rationales: "We need to ride the animal or get left behind," or "Change is inevitable, so we might as well get used to it." Judging from today's reports, the working groups paid more attention to incremental adjustments than to transforming solutions. While the idea of

a "national digital library" is tantalizing, it is not yet persuasive.

As a result of this conference, The Research Libraries Group is unlikely to make major changes in its agenda. We will continue to increase the range of primary cultural data in our databases and to work on standards. We will follow with interest whatever consultative or coordinative apparatus may develop from our conversations here, and welcome individual conversations and initiatives which promise to improve access to information resources in the humanities.

Remarks by Michael Ester

One key insight gained from the conference was the tremendous need for better communication among scholars, including expanded opportunities for faculty members to learn about new technology that might have an impact on their work. One strong argument for the humanities' involvement in new technology was that the cost of doing research in an electronic world will rise beyond the means of individuals, demanding collective and collaborative solutions among universities to create and share information resources. To the wider community in which the humanities participate, we must argue the value of the humanities to society as a whole. This is not an easy task, but it is a necessary part of the work of humanists.

Regarding the proposed electronic library, will it focus primarily on materials that are easy to scan and reproduce digitally? Might it exclude difficult materials in the art world, such as the building records of the Sistine Chapel? It was unreasonable to expect that the conference would be comprehensive or that it would speak definitively for those involved in the humanities and technology, but the event was a good beginning for a much more extensive process of investigation.

Remarks by W. David Penniman

At the beginning of this meeting, I stated my vision for the library of the future, which would play a major role in education and research. I was pleased to find my convictions reinforced by the conference and to hear of exciting initiatives that were currently under way. Little attention, however, was paid to something of personal interest: research on the role that browsing and serendipity play in the scholarly process and how

technology would affect this phenomenon. Technology should actually enhance browsing by making it easier to explore the corners and unbeaten paths of research material.

The participants might ponder two questions: How do the conclusions of, and issues raised by, the conference alter the scheme of things? Since we must find ways to make the case for the humanities, how can technology add value to the basic resources now used by scholars? Perhaps we need to think creatively, even "crazily," about these issues to generate new ideas. I was particularly impressed with the work of Marilyn Lavin at Princeton, who uses technology to explore the "corners" of works of art more easily, as a metaphor for the promise of information technology and the scholarly process.

Remarks by Stanley Katz

Attending the conference was like eating an artichoke: there was "something wonderful" revealed after much unappealing and difficult work. While the meeting identified exciting prospects and opportunities, it was also clear that much difficult work still lies ahead. The larger agenda for this conference was a traditional one for the American Council of Learned Societies, in that it concerned scholarly communication.

One of the ACLS's central mandates is to promote new ideas about scholarly communication in the humanities and social sciences at the national level so that scholars can share the knowledge they create with other citizens in this society and with future generations. However, given current political and financial constraints, universities might "turn in among themselves," making it far more difficult to maintain the notion of a national and international scholarly community. Because the ACLS lacks any concrete institutional power, it can be effective only by reinforcing the links between institutions and working collaboratively, with an activist and unified humanities community to reinforce the common weal for the humanities. Conferences such as this one help the ACLS articulate the ultimate importance of the humanities and education in general to the success of a democratic society in the modern era. Technology provides us with a tremendous opportunity to think and create in new ways. By doing so, we rise to the challenge of being a global, intellectual, and democratic community and aim to achieve the highest intellectual and moral values in life in ways that were not possible for previous generations.

Sponsoring Organizations

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DESCRIPTIONS OF THE SPONSORING ORGANIZATIONS

The Getty Art History Information Program

The Getty Art History Information Program (AHIP), one of seven operating programs of the J. Paul Getty Trust, seeks to make art historical information more accessible to scholars and researchers through the use of advanced computer technology. It does so by promoting common perspectives and standards among international institutions and organizations on projects in four general areas: coordinating vocabularies to facilitate consistent data entry and retrieval; providing bibliographic services; assembling art historical databases; and conducting research to help define automation directions for art information. AHIP plays a catalytic role in helping to focus attention on the collective changes facing the information community in this decade and beyond. Among AHIP's numerous projects are the *Art and Architecture Thesaurus*, the *Bibliography of the History of Art*, the Provenance Index, and the Art Information Task Force.

The American Council of Learned Societies

The American Council of Learned Societies (ACLS) is a private nonprofit federation of 52 national scholarly organizations. The purpose of the Council, as set forth in its constitution, is "the advancement of humanistic studies and the maintenance and strengthening of relations among the national societies devoted to such studies." Included in the program of the Council are awards to individual scholars to advance research in the humanities and humanistic aspects of the social sciences; support for international scholarly research and exchanges; activities concerned with the identification of present and future needs of humanistic scholarship, and planning and development to meet these needs; and organizational functions. In addition, the Council has fiscal and adminstrative oversight for the Council for International Exchange of Scholars (CIES), which administers the Fulbright program.

Organized in 1919 and incorporated in the District of Columbia in 1924, the ACLS was granted a federal charter through the United States Congress in 1982.

The Coalition for Networked Information

The Coalition for Networked Information was founded in March 1990 to help realize the promise of advanced networks and high-performance

computing for information access and delivery. The Coalition was established by three associations: The Association for Research Libraries (ARL), CAUSE, and EDUCOM. ARL is an association promoting equitable access and effective use of recorded knowledge supporting teaching, research, and scholarship. CAUSE and EDUCOM are dedicated to introducing, using, and managing information technology and related resources in research in general and higher education. The Coalition for Networked Information promotes the creation of access to information resources in networked environments in order to enrich scholarship and enhance intellectual productivity.

A Task Force of institutions and organizations able and willing to contribute resources and attention to the mission of the Coalition was created in 1990 and continues to grow. This Task Force now provides a common vehicle by which nearly 170 institutions and organizations pursue a shared vision of information management and how it must change in the 1990s to meet the social, educational, and economic opportunities and challenges of the 21st century. Members of the Task Force include higher education institutions, publishers, network service providers, computer hardware, software, and systems companies, library networks and organizations, and public and state libraries.

Council on Library Resources

The Council on Library Resources was founded in 1956 with support from the Ford Foundation to aid in the solution of the problems of libraries generally, and research libraries particularly, by putting emerging technologies to use in order to improve operating performance and expand library services. While continuing its initial concentration on technological applications in libraries, the Council had gradually expanded its focus to reflect changing needs and opportunities in areas such as linking computer systems, making library management more effective, improving access to library materials, addressing international concerns, exploring cooperative approaches, and enhancing the skills of librarians. The Council now derives its support from a number of foundations in areas consonant with their program interests. The areas currently receiving attention include human resources, the economics of information services, infrastructure, and access and processing.

The Research Libraries Group, Inc

The Research Libraries Group, Inc. (RLG) is a not-for-profit membership corporation of more than 120 universities, archives, historical societies, museums, and other institutions devoted to improving access to information that supports research and learning. RLG owns and operates RLIN® (the Research Libraries Information Network) to serve the research and information management needs of both its members and nonmember institutions and individuals worldwide.

RLG's objectives for the 1990s include:

- to support cooperative solutions among research libraries, archives, museums, and related repositories;
- to create an information delivery service capable of putting catalog, index, abstract, full-text and image information directly into the hands of scholars and students;
- to manage coordinated preservation projects that extend models developed for the preservation of brittle paper materials to photographs and electronic media;
- to develop a local computer system serving archives, museums, and related repositories, linked to an increasingly comprehensive database of primary cultural and scientific information; and
- to facilitate the most effective access to information resources.

RLG membership is open to any nonprofit institution with an educational, cultural, or scientific mission.

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TECHNOLOGY, SCHOLARSHIP, AND THE HUMANITIES
The Implications of Electronic Information
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